RESEARCH ARTICLE

An Analysis of Exports and Imports and Their Effect on the Economic Growth in Iraq

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ABSTRACT

The Iraqi economy faces more challenges than opportunities, especially in recent years due to the civil war, while basic reforms for merging the private and public sector have commenced. This paper examines the causal relationship between exports, imports, and Iraq's economic growth. The data are annual time series for the period 1980-2017. Thereafter, the data are stationary in different levels. Johansen cointegration is applied to figure out the long-run association among the variables. Moreover, Granger causality test has been used to direct the causality among variables. This paper finds that in the long run, exports and imports on gross domestic product are co-integrated and variables have a long-run association. The Granger causality result shows that exports affect economic growth, while imports also have a positive impact on Iraq's economic growth. On the contrary, the relationship between exports and imports show that any increase in the volume of exports will increase the volume of imports. However, the converse is not true as the volume of imports does not influence exports in Iraq.

Keyword: Economic growth, Exports, Imports, Johansen co-integration, Granger causality

1. INTRODUCTION

An increase in the percentage of exports is considered to improve the country's production which will lead to increased employment and growth in the economy. Din et al., 2003, used the Export-Led Growth (ELG) hypothesis to figure out the causal relationship between exports and economic growth. First, export growth and international trade play important roles in enhancing growth in the economy in view of the fact that they provide positive benefits to externalities. For instance, companies engaged in trading exports can appreciate advantages in the areas of productivity, asset diversification, more prominent asset utilization, improper use of economy of scope and scale, and expansion of technology and its development through competition with foreign traders. Second, expansion in export also leads to participation in the foreign exchange market and thus permits imports of capital to the country which transfers potential income and production to the country in the long term. Third, the competition in the international market affects the economy's scope and scale and speeds up productivity.

Given the hypothetical contentions mentioned, the observed solid correlation between export and growth in production is described in the empirical

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evidence for the export-led growth (ELG) hypothesis. Whereas, Import-Led Growth (ILG) proposes that the development of the economy can be obtained principally by expansion in import. Endogenous growth models (EGM) demonstrate that import could be a critical factor for growth of economy in the long term as it gives the companies access to the intermediate requirement factors and foreign innovation (Coe, 1995). An expansion in the volume of imports can fill in as a mechanism for developing countries to exchange of foreign information from developed countries (Ball & Mazumder, 2011).

The gross domestic product (GDP) is the market value of all produced goods and services of a country during a period. The GDP of Iraq has increased over the years, with its present percentage estimated at 0.32% of the world economy. The GDP of Iraq increased from US $1.70 billion in 1960, recorded as its lowest, to US $197.72 billion in 2017. The highest figure of US $234.65 billion was recorded in 2014. Further information is presented in Figure 1 and Table 1.

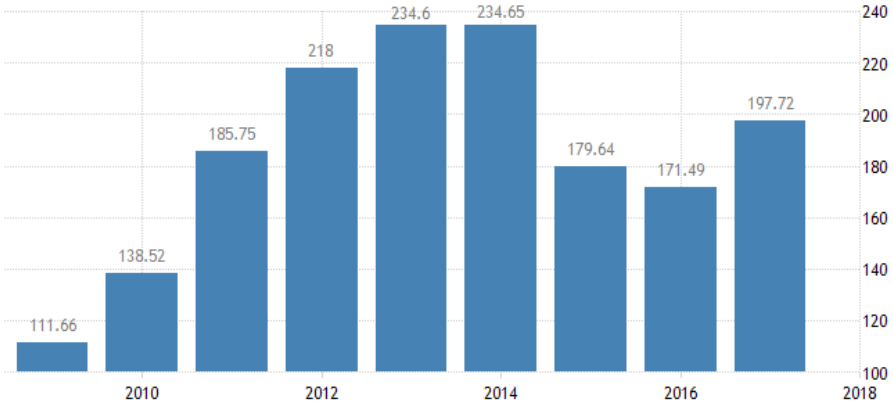

Figure 1. The Gross Domestic Product in Iraq

Table 1: Growth domestic production in Iraq

Iraq GDP	Last	Previous	Highest	Lowest	Unit	
GDP Annual Growth Rate	-0.50	11.00	54.16	-56.40	Percent	[+]
GDP	197.72	171.49	234.65	1.70	USD Billion	[+]
Gross National Product	224153528.60	240917008.90	240917008.90	20594974.80	IQD Million	[+]
GDP per capita	5545.90	5750.60	5750.60	1427.90	USD	[+]
GDP per capita PPP	15663.99	16242.10	16242.10	4033.00	USD	[+]

With regard to exports, Iraq takes 43rd place in the world economy. It exported $60.8 billion and imported $29.7 billion in 2017, resulting in a positive trade balance of $31 billion. The GDP was about $192 billion and the per capita income was $16.9 thousand in 2017. Its main exports were crude oil ($57.5 billion), refined oil ($1.47 billion), pure gold ($1.4 billion), gas ($92.5 million), and tropical fruits ($66.7 million). While the main imports were jewelry ($960 million), medicine ($677 million), meat ($643 million), cars ($629 million), and gold ($621 million) (Gabriela, Zaqeer, & Al-saedi, 2016). Further information is provided in Figure 2, where the blue and red lines represent the amount of exports and imports, respectively.

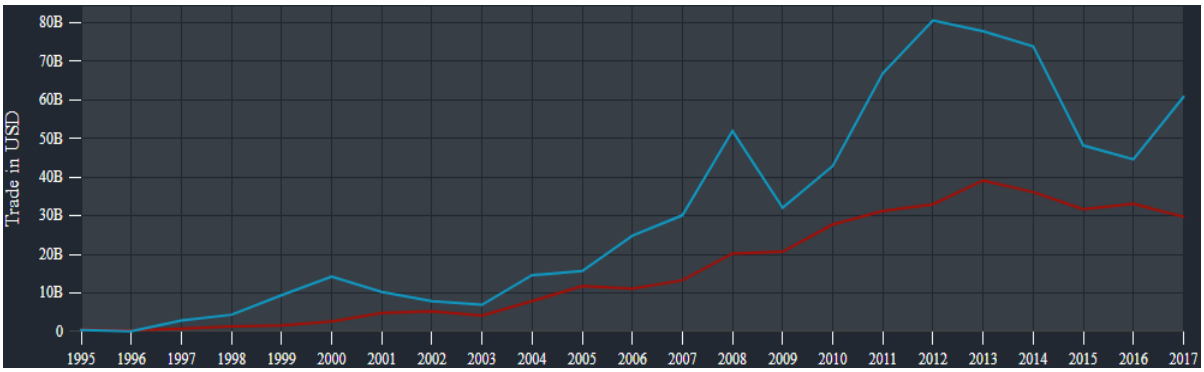

Figure 2. Exports and imports in Iraq.

This paper analyzes the causal correlation among exports, imports, and economic growth in Iraq. Conflicting with the most recent studies of ELG hypothesis, this investigation indicates an expanded generation to test for the impact of export and import to the GDP to figure out the causality and long-term correlation between them. Moreover, the data are annual time series from 1980 to 2017 undertaken in Iraq, using the methods of co-integration and Granger tests (Manamperi, 2016; Todshki & Ranjbaraki, 2016; Sciencedirect, 2013).

The paper is classified in the following manner. In the following section, Literature Review, previous results are provided, Section 3 provides data and methodology, Section 4 provides details on the empirical models and results of the analysis and finally, Section 5 provides discussions and conclusion to the paper.

2. LITERATURE REVIEW

Fojtíková, 2014, used quarterly data for Slovakia for the period 2001 - 2010, where Granger causality test was utilized. To begin with, the data were arranged for calculation. Export and GDP were adjusted. Test outcomes demonstrated that exports, imports, and GDP are stationary at first difference. This outcome required further investigations, and Johansen cointegration test was applied. The test showed positive long-term correlation between foreign direct investment (FDI) and GDP, in addition to a long-run association between exports and GDP. Awokuse, 2007, adds to this study by utilizing a model of neoclassical growth and multivariable co-integration VAR method to research the impacts of imports, exports, and GDP in Poland, Czech Republic, and Bulgaria. The test result for Bulgaria showed the existence of empirical evidence for both hypotheses of ELG and ILG. In the case of Czech Republic, the result of the Granger causality test driven from export and import to GDP provides the empirical evidence for ELG and ILG. Interestingly, just the ILG speculation is upheld in the case of Poland. In conclusion, this current examination's findings show the rejection of import and the particular focal point of numerous previous investigations simply on the impact of export as the key for economic growth.

On the contrary, the outcome of an investigation by Neves et al., 2016, of more than 340 companies over the period 2006 - 2012 demonstrates that there is a direct correlation between the companies' decisions to export, and take part in Research and Development (R&D). Hence, increased participation in Research and Development (R&D) leads to an increase in the companies' exports. Such outcomes propose the existence of correlation between exports and R&D, and this outcome is in accordance with the latest studies in that field, most strikingly with that by Oum et al., 2018. The causality between imports and economic growth is additionally explored by Burchart-Korol et al., 2018, for Indian manufacturing companies by testing the self-determination hypothesis for large volumes of import

In the study by Demir et al., 2014, the economic growth of Turkey declined due to the crisis in Iraq as it had been importing goods and services from Turkey, as well as due to the significant changes

that occurred in Turkey in 1980. Assessment was carried out from 1988 which was the year break down between Iraq's and Turkey relations when exports of Turkish influenced, until the prohibition of Iraq has terminated by United Nations in 2003. Finally, expected returns were discounted from the realized returns from the exports to figure out the economy's depreciation in that period in Turkey. Todshki & Ranjbaraki, 2016, found the existence of causality between export, import, and economic growth in Iran for the period of 1995 to 2016. It is shown that the association of economic growth with export is bidirectional, and imports also have an impact on economic growth. On this premise, the theory of gross domestic product has a significant and positive effect on the GDP of Iran.

As the foreign investments concerned in business relationships with the Arabic country face more challenges than opportunities, corruption remains to be the principal obstruction for making an appropriate atmosphere for drawing in potential partners and cultivating ties with foreign investors.

3. DATA AND METHODOLOGY

3.1. Data

The data are annual observations of Iraq's real GDP (y), real exports (x), and real imports (m), time series data are used from 1980 until 2017, which is 38 observations to investigate how the exports and imports affect the economic growth over the period. The data include Iraq's economic growth rate as represented by GDP, y, which is constant as a dependent variable and the exports and imports as independent variables over a period, with data gathered from World Bank and central bank of Iraq.

3.2. Methodology

In this study, three different types of tests are used and all of them were tested by the EViews 10 software program. In the first step, unit root test was applied to figure out the stationarity of the data, with GDP as a constant and dependent variable and exports and imports as independent variables. Second, Johansen cointegration test has been applied to identify co-integration among. Lastly, Granger causality test was employed to figure out the existence of causality among the variables or the variables' effect on each other during the period. Furthermore, one dependent variable was used in the model and other variables are independent variables illustrated as follows:

$$\ln GDP_t = \beta_0 + \beta_1 \ln E_t + \beta_2 \ln M_t + \varepsilon_t \qquad (1)$$

where lnGDP represents the logarithmic term of Economic growth, lnE represents the logarithmic term of real exports, and lnM represents the logarithmic term of real imports.

4. EMPIRICAL MODELS AND ANALYSIS RESULTS

4.1. Unit Root Test

The Phillips Perron (PP) and the Augmented Dickey Fuller (ADF) tests were applied in the models to determine the stationarity of the data, meaning the null hypothesis, H0, is not stationary or have unit root and alternative hypothesis stationary, or H0 is stationary meaning that as it does not have unit root, we can reject null hypothesis (H0) rather than accept an alternative hypothesis (H1). The results show that the data are stationary in different levels. Moreover, in case of the ADF, there may be a problem of autocorrelation because of the process for ADF test there are several different decisions, such as whether our models walk with trend and drift or just drift or none of them (trend and intercept). A sample model for ADF test is stated as follows (equations 2, 3, and 4), and further information is provided in Tables 2, 3, 4, and 5.

$$\Delta y_t = \beta 1 + z y_{t-1} + \alpha_i + \epsilon_t \qquad \text{Intercept only} \quad (2)$$

$$\Delta y_t = \beta 1 + \beta 2_t + z y_{t-1} + \alpha_i + \epsilon_t \qquad \text{Trend and Intercept} \quad (3)$$

$$\Delta y_t = z y_{t-1} + \alpha_i + \epsilon_t \qquad \text{No Trend no Intercept} \quad (4)$$

Table 1: ADF test results for the Unit Root (intercept)

Variables	Level					At the First difference				
		Test	Critical values				Test	Critical values		
	Prob.	statistic	1%	5%	10%	Prob.	statistic	1%	5%	10%
GDP (y)	0.9851	0.5181	-3.62	-2.94	-2.61	0.0000	-7.322	-3.62	-2.94	-2.61
Exports I	0.3283	-1.9008	-3.62	-2.94	-2.61	0.0001	-5.517	-3.62	-2.94	-2.61
Imports (m)	0.2797	-2.0141	-3.62	-2.94	-2.61	0.0000	-6.253	-3.62	-2.94	-2.61

Table 2: ADF test results for the Unit Root (intercept and trend)

Variables	Level					At the First difference				
		Test	Critical values				Test	Critical values		
	Prob.	statistic	1%	5%	10%	Prob.	statistic	1%	5%	10%
GDP (y)	0.5547	-2.0515	-4.22	-3.53	-3.20	0.0000	-7.863	-4.23	-3.54	-3.20
Exports I	0.4075	-2.3314	-4.22	-3.53	-3.20	0.0005	-5.408	-4.23	-3.54	-3.20
Imports (m)	0.5647	-2.0328	-4.22	-3.53	-3.20	0.0000	-6.217	-4.23	-3.54	-3.20

Table 3: Phillips-Perron (PP) test results for the Unit Root (intercept)

Variables	Level					First difference				
		Test	Critical values				Test	Critical values		
	Prob.	statistic	1%	5%	10%	Prob.	statistic	1%	5%	10%
GDP (y)	0.9977	1.2133	-3.62	-2.94	-2.61	0.0000	-7.322	-3.62	-2.94	-2.61
Exports I	0.2448	-2.1026	-3.62	-2.94	-2.61	0.0001	-5.517	-3.62	-2.94	-2.61
Imports (m)	0.2250	-2.1561	-3.62	-2.94	-2.61	0.0000	-6.248	-3.62	-2.94	-2.61

Table 4: Phillips-Perron (PP) test results for the Unit Root (intercept and trend)

Variables	Level					First difference				
		Test	Critical values				Test	Critical values		
	Prob.	statistic	1%	5%	10%	Prob.	statistic	1%	5%	10%
GDP (y)	0.6341	-1.9005	-4.22	-3.53	-3.20	0.0000	-9.579	-4.23	-3.54	-3.20
Exports I	0.3187	-2.5169	-4.22	-3.53	-3.20	0.0005	-5.408	-4.22	-3.53	-3.20
Imports (m)	0.4937	-2.1659	-4.22	-3.53	-3.20	0.0000	-6.226	-4.22	-3.53	-3.20

Note: All of the variables are at their normal logarithms.

Both ADF and PP tests were accomplished from broadest to the slightest explicit model which is taking out trend and intercept over the models. The unit root test has been conveyed in EViews.

4.2. Johansen Cointegration Test

After the unit root tests of variables which is GDP, E, and M were not stationary at level but when they are converted into first difference I (1), they will be stationary and should run the model by testing Johansen cointegration to determine whether variables move together and have a direct or indirect relationship, meaning that there should be co-integration among variables also. A Trace test shows the number of co-integrations that exist among variables. The methodology for Johansen cointegration is illustrated as follows in the VAR model:

$$X_t = \Pi_1 X_{t-1} + \ldots + \Pi_K X_{t-K} + \mu + e_t \quad (\text{for } t = 1, \ldots T) \qquad (5)$$

Where Xt and Xt-1,…Xt-K represent the vectors and lagged values of probability variables; Π1,….,ΠK represent coefficient matrices (number of assumptions that were not auto correlated in terms of error); μ represents an intercept vector and et represents a vector of random errors.

In this case, 1 to 4 lags interval has been used. First, the result of *P* value is less than 5%, so according to the *P* value, H0 can be rejected and H1 value, accepted. Regarding the trace statistic, H0 value is rejected which is greater than critical value. Second, according to the At most 1 (At most 1 means at least one co-integration equation or every rest variable is co-integrated having one co-integrating equation), if the *P* value is more than 5% H0 cannot be rejected rather than accept null hypothesis otherwise H1 can be rejected meaning that there is at least one co-integrated vector that exists. On the contrary, the test can check trace value here its smaller than critical value in this case null hypothesis cannot be rejected but accepted as null. Moreover, according to the trace statistic and Max-Eigen statistic, all variables are co-integrated, and they have a long-run association and move together. The results are shown in Table 5.

Table 5: Johansen test for co-integration

Hypothesis LNGDP LNE LNM	Trace Statistic	Critical Value		Prob.**	Result H0
		5%	1%		
None **	35.28567	29.797	35.45817	0.0105	Rejected
At most 1	8.453542	15.494	19.93711	0.4182	No rejected
At most 2	1.471422	3.841	6.634897	0.2251	No rejected

Note: Lags interval (at the first differences): from 1 to 4.

The Trace test demonstrates one co-integration at both 5% and 1% levels.

* (**) defines the hypothesis rejection at the 5% and 1% levels.

4.3. Granger Causality Test

After the Johansen cointegration test was applied, the Granger Causality test was applied to the model to determine whether the variables are related to each other or causality exists among the variables. Another factor to be considered in this stage is that the data should be stationary before running the Granger Causality test. The unit root test results confirmed that the data are stationary in different levels. The criterion for the Granger Causality test is to ensure that the null hypothesis can be rejected based on F-statistic approach. If the result of *P* value is more than 10%, the null hypothesis cannot be rejected rather accepting the alternative hypothesis should be rejected, otherwise the result of the *P* value if less than 10% null hypothesis can be rejected and accept alternative. If the null hypothesis is rejected, it means that GDP, which is a dependent variable, causes exports (E) and imports (M), which are independent variables. The model for the data is shown as follows, and the results of the Granger Causality test is shown in Table 6.

$$\ln GDP_t = \sum_{i=1}^{n} \alpha\ InE_{t-i} + \sum_{t-i}^{n} \beta\ InjGDP_{t-j} + U1_t$$

$$\ln E_t = \sum_{i=1}^{n} \lambda\ InE_{t-i} + \sum_{t-i}^{n} \delta InjGDP_{t-j} + U2_t$$

$$\ln GDP_t = \sum_{i=1}^{n} \alpha\ InM_{t-i} + \sum_{t-i}^{n} \beta\ InjGDP_{t-j} + U1_t$$

$$\ln M_t = \sum_{i=1}^{n} \lambda\ InM_{t-i} + \sum_{t-i}^{n} \delta InjGDP_{t-j} + U2_t$$

Where lnGDP represents the logarithm form of economic growth, lnE represents the logarithm form of exports, InM represents the logarithm form of imports, t represents the periods, t-1 represents the number of years of lag consumption variables, and Ut represents the residual of the fast model

Table 6: Granger causality outcome

	Lag levels	Lag 1			Lag 2		
	Null Hypothesis	F-Stat	P-value	Result	F-Stat	P-value	Result
	GDP and Exports E						
1	E Dose cause GDP	4.0728	0.0518	Reject null	3.0673	0.0614	Reject null
	GDP Dose not cause E	0.5275	0.4727	Do not reject null	0.3184	0.7297	Do not reject null
	GPD and Imports M						
2	M dose cause GDP	6.5175	0.0155	Reject null	4.1997	0.0247	Reject null
	GDP Dose not cause M	0.0901	0.7659	Do not reject null	0.0879	0.9160	Do not reject null
	Exports E ,Imports M						
3	M Dose not cause E	0.1235	0.7274	Do not reject null	0.1204	0.8870	Do not reject null
	E Dose cause M	1.8399	0.1842	Do not reject null	3.8985	0.0313	Reject null

5. DISCUSSION AND CONCLUSIONS

Nonetheless, the efforts of Iraq in world trade is admirable for the way in which it has managed to steady difficulties, as consistency and dedication to the common objective of recuperation and redevelopment of Iraq ought not to be underestimated by the international traders. While the commencement of auxiliary changes for combining private and public area improvement is negotiable, the exports and imports, alongside with foreign direct investments, should back up the necessities of a nation like Iraq.

This study empirically applied the possible long-term associations and relationship of causality between economic growth, exports, and imports in Iraq. The findings of the Johansson cointegration test shows that all variables have a long-run association mean that economic growth in Iraq move in concurrence with exports and imports. Also, the Granger causality result shows that exports affect economic growth and imports have a positive impact on economic growth. On the contrary, imports caused by exports show that any increase in amount of exports will increase the amount of import. Moreover, the imports in Iraq do not cause exports.

Despite the fact that the parity of trade has balanced out in the recent years, Iraq still needs to improve its trade rules, as the foreign investors engaged in business with the Arab nations face a larger number of difficulties than opportunities. Corruption is the primary obstacle in creating an atmosphere suitable for attracting potential accomplices and encouraging ties with the traders. While critical advancements in some trade sectors have been made, the government's failed attempts to execute anti-corruption policy have undermined the autonomy of Iraqi primary bodies as they struggle with corruption. With regard to the development of

Iraq and the Levant because of untraceable subsidy, Iraq has acquiesced to the task of MENA's financial Action Force and focused on addressing insufficiencies in the framework by gathering the measures of the previously mentioned territorial body.

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